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CARNIVOROUS PLANT NEWSLETTER

VOLUME 8, Number 2 JUNE, 1979





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Cover

A close up of the flower of *Utricularia longifolia,* one of the largest members of the genus. It is also self-fertile, but needs to be pollinated by hand where insects are not available. The yellow stripe probably serves as a guide for potential pollinators.

Photo by L. Song

The co-editors of CPN would like everyone to pay particular attention to the following policies regarding your subscription to CPN:

All correspondence regarding subscriptions, address changes and missing issues should be sent to Pat Hansen, c/o The Fullerton Arboretum, California State University, Fullerton, CA 92634. DO NOT SEND TO THE CO-EDITORS. Checks for subscriptions and reprints should be made payable to CSUF FOUNDATION — ARBORETUM.

All material for publication, comments and general correspondence about your plants, field trips or special noteworthy events relating to CP should be directed to one of the co-editors. We are interested in all news related to carnivorous plants and rely on the membership to supply us with this information so that we can share it with others.

Views expressed in this publication are those of the authors, not necessarily the editorial staff.

Copy deadline for the September issue is August 1, 1979.

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Editor's Corner

We sincerely hope you enjoyed the *Nepenthes* issue of CPN. We would like to apologize for the late appearance of that issue and for the fact that so many of you had to take the trouble to write inquiring about it. We realize that much confusion resulted, particularly regarding the various deadlines announced: therefore, adjustments have been made, and those deadlines have not yet been imposed. See below.

In this issue, we will cover some of the interesting genera in the Lentibulariaceae — *Pinguicula* (butterworts) and *Utricularia* (bladderworts, fairy aprons), both of which have very interesting and beautiful flowers. We would encourage our readers to try growing some of these plants, the seeds of which can be ordered from the Seed Bank.

Seed Bank

SEED BANK INVENTORY
April 30, 1979
Cost $.50 per packet
(Number of packets listed if less than 15)

Darlingtonia californica; Dionaea muscipula (15); *Drosera aliciae* (pale fl.); *D. anglica, D. auriculata, D. binata* (8), *D. brevifolia* (5), *D. bureana* (4), *D. burmannii, D. burmannii* (Australia) (4), *D. capensis, D. capensis* (reg. & narrow mixed), *D. capensis* (narrow), *D. capillaris, D. capillaris* (Gulf Giant) (4), *D. capillaris* (long leaf), *D. capillaris* (white fl.) (10), *D. capillaris* (mixed types), *D. filiformis filiformis, D. glanduligera* (7), *D. indica* (red fl.) (6), *D. intermedia, D.* "Lake Badgerup" (7), *D. macrantha* (11), *D. montana* (white fl.) *D. natalensis, D. peltata, D. planchonii* (2), *D. pygmaea* (1), *D. rotundifolia, D. spathulata, D. spath.* (Australian), *D. spath.* (Kansai), *D. spath.* (Kanto), *D. spath.* (round leaf — Japan) (1), *D. spath.* (white fl.) (10), *D. whittakeri* (9), *D. sp.* (3); *Nepenthes ampullaria* (Borneo), *N. khasiana, N. chelsonii* x *rafflesiana, N. chelsonii* x *williamsii* (6), *N. intermedia* x *rafflesiana, N. morganii* x *williamsii* (15), *N. rafflesiana* (vittata) x *rafflesiana* (Singapore) (7); *Pinguicula lusitanicum, P. lutea, P. primuliflora* (2), *P. vulgaris* (2); *Sarracenia alata* (10), *S. alata* (purple throat) (1), *S. alata* (x-ray, 100 rads) (15), *S. alata* (x-ray, 550 rads) (5), *S. flava, S. flava* (Gulf), *S. flava* (Gulf — heavy vein), *S. flava* (Gulf — yellow & heavy vein mix), *S. flava* (Gulf — red with green lid) (2), *S. leucophylla, S. leucophylla* (yellow fl.) (2), *S. minor, S. oreophylla* (8), *S. psittacina* (Gulf), *S. purpurea* (Gulf) (8), *S. purpurea purpurea, S. purpurea venosa, S. purpurea venosa* (pink fl.), *S. rubra* (10), *S. rubra* (Gulf), *S. rubra alabamensis, S. rubra jonesii, S. rubra wherryi* (10), *S. alata* x *leuco.?, S. alata* (purple) x *leuco., S. alata* x (*leuco.* x *psitt.*), *S. flava* x *purp.* x *flava* (4), *S.* x *harperi* (5), *S. leuco.* x *rubra* F_2 (12), *S. minor* x *psitt.; Utricularia juncea* (6), *U. subulata* (6). Late additions: *N. raf.* - Singapore, *N. intermedia* x *N. hookeriana*-cult. type.

See CPN 8 : 4 for instructions on sending and ordering seed.

SPECIAL NOTICE

The book order deadline announced in the last issue has been postponed until 31 August 1979. All orders, with payment, must be sent to Joe Mazrimas before that date.

News and Views

In a recent issue of CPN, we mentioned the start of the BRITISH CARNIVOROUS PLANT SOCIETY (CPN 7 : 117, 1978). They have made a fine beginning but have had some difficulties with their secretary whom we listed as the contact. Since then, Chairman John Watkins reports that a new secretary has been elected. He also requests that if you did not receive a reply from the old secretary, then forward your inquiry again to the new secretary, listed below, who will answer promptly. Also, all unreturned checks to the old secretary should be cancelled and new ones issued. If your check has passed but you have not heard anything since, again contact the new secretary, Mr. Eric Binstead.

John Watkins regrets the confusion but now feels the problem is cleared up.

DOUG BURDIC (604½ NW 31st, Corvallis, OR 97330) writes: First of all, I want to compliment you on your excellent newsletter. I am a horticulture major at Oregon State University, and the expertise and scientific knowledge that your paper exhibits on CP and how to grow them is not excelled anyplace that I've seen.

The purpose of my note is to inform my fellow and fella subscribers of a short, inexpensive book I bought on how to build a long, inexpensive greenhouse. The book costs $2.50, and the greenhouse costs $29.95 to build. It can be completed in one day. Dimensions are 5′ x 10′ x 6′ tall. It consists of PVC pipe, plastic and a few screws. For an additional $12.00, a self-watering system can be built in along with benches. It is portable and, surprisingly enough, is not an eyesore like one would expect it might be for that kind of money. The book is entitled *The $29.95 Greenhouse* by Luciano and Chuck Koehler, Hidden House Publications, 1977, Palo Alto, CA. It can be purchased from Craft Trends, Inc., 505 Hamilton Ave., Suite 105, Palo Alto, CA 94301, (415) 327-5501.

I believe one of the most striking features of carnivorous plants is their beautiful coloration, and unless one can provide enough light for them in captivity, they cannot be rewarded by observing these colors. Hopefully, this book will help my CPN comrades in enjoying these plants all the more.

WILLIAM J. CLEMENS (17398 Poplar Street, Fountain Valley, CA 92708) writes: I am a recent subscriber to CPN and would like to include the following information about myself and what I grow so that I might be able to join the ranks of the more experienced growers. First, I began growing CP with the standard Venus' flytrap from the local hardware store when I was 12 years old (1969). Since that time, I have grown and experimented with many genera and have had varied success.

I have had the most success with *Drosera* and *Sarracenia* species, *Darlingtonia* a little slower growing than the former, but eventually producing many small plantlets on short rhizomes. I grow everything in a small 5′ x 5′ x 8′ plastic greenhouse. Last winter I put plants requiring dormancy in plastic bags to prevent dessication and then stored them in the refrigerator for four months. They seemed to find this to their satisfaction. I would like to trade with other growers in order to gain more experience with other species of *Drosera* and also *Cephalotus, Pinguicula* and *Nepenthes.*

SUSAN HATLEY, who partners with her husband KEN, (Wandena Rd., Bullsbrook East, Western Australia 6084), in The Exotic and Bizarre Nursery of Perth, Western Australia, is an

avid lover of Carnivorous Plants and has been since the day 5 years ago, when she purchased her first CP, a slightly tattered frail little *Dionaea,* displayed in a plant shop window, took the plant home and nursed it up to a healthy and vigorous plant.

Next came a *Nepenthes sp.* which did equally as well. From there, there was no looking back for Sue, it was complete dedication to these beautiful plants, which opened up a complete new world to her. She vowed then, that one day, she would have the finest collection of these plants in the world, though admits, she has a long way to go to reach that goal.

Her private collection, which she houses in a 24 ft. x 15 ft. hot-house, contains some 125 different varieties of CP's which include some of the most exotic of the Asian *Nepenthes.* The hobby soon became too large for its accommodation and further houses were built, it was at this stage, that she decided on opening the first CP Nursery in Australia, and since then has introduced some 200 keen new growers to the CP world.

Susan's days are kept busy between caring for her young family, and working in the nursery, and it's a rare night that she can't be found behind her typewriter returning letters to the many CP friends she has acquired around the world.

She also finds time to co-edit the newly formed Carnivorous Plant Newsletter of Australia along with her husband. A busy life but one full of stimulating rewards.

Their Nursery is situated on a 10 acre block, 35 miles north of Perth. The area climate ranges from 30°C to 40°C in summer and a 10°C to 20°C in the winter and apart from propagation beds, no temperature control is used in the hot-houses.

Future plans include two further 32 x 20 ft. hot-houses, one of these to be used for the growing of exotic ferns and indoor plants, the other for their ever increasing family of CP pets. She writes:

In regards to the problem we had with selling to America, we have decided to rearrange our whole system, and from this date we have entered into an agreement with Roy Minton of 'Carolina Exotic Gardens' to be our agent in America, which will benefit all in the long run. We will be able to send in bulk to Roy, who in turn will distribute to the U.S. customers, thus saving for you local growers, I should imagine, a large amount in freight costs, also eliminating any losses incurred in lengthy travel time.

STEVE HAWKINS (Rt. #4, Forest Hills, Marion, NC 28752) writes: I do quite a good deal of artwork and have put together a booklet of line drawings which I think some CPN'ers might be interested in. It includes a list of species and any available culture information. For this the postage will be quite expensive, so I find it necessary to charge $.50 per copy.

STEPHEN JACKSON (C. P. N. A. Seed Bank, 478 Mitcham Road, Mitcham, Victoria, Australia 3132).

As some of you know, Ken and Susan Hatley are organizing our own CPN which is near its first printing. As with your Newsletter, our CPN is going to have a seed bank and that's where I come in. I will be Pat Dwyer's Australian counterpart. I really just want to let you know of the bank's existence and ask for any spare seed that you might donate to our bank to give it a good start. Of course, the last thing that I want is for seed that would have gone to your bank to go to ours, but any excess after that would be greatly appreciated.

JOE MAZRIMAS (329 Helen Way, Livermore, CA 94550) reports that he and LARRY LOGOTETA exhibited their CP at the California Spring Garden show held at the Lakeside Park Garden Center in Oakland, Ca from May 2 through Sunday, May 6. Many visitors

were impressed seeing the large *Nepenthes ventricosa* and *N.* x *Rokko* hybrid as well as the large magenta flowers of *Drosera hamiltonii.* About 20 plants were shown in this show which is open to all CPN members. This show will be held again next spring and I would like to invite everyone in the area to enter plants in the show. Entry fee is just $.50 per plant that is entered for the competition and first prize award in each category is $5.00. Carnivorous plants are judged in their own division with 8 first place awards awarded to the best *Darlingtonia, Dionaea, Drosera, Sarracenia,* Terrarium, other genera, unnamed hybrid and best plant. For an entry blank and rule book, write to California Spring Garden Show, 1515 Webster St., Suite 506, Oakland, CA 94612. For the 1980 show, write in April, 1980, for the current rules and new entry form. The form must be submitted about two weeks before the show begins.

Right now, I would like to make the first announcement for another CP exhibition to be held at the San Francisco Flower Show in August 24 through August 26, 1979. All CPN members are invited to submit plants for competition for similar categories as mentioned above. On or about August 1, 1979 write to Mr. Howard Conrad, 1339 Taraval St., San Francisco, CA 94116 for rules and application form. A $1.50 fee is required for an exhibitor's pass and can be sent in to Mr. Howard Conrad, at the same time before August 15th, which is the deadline for application forms. On August 22 the plants are set up and judged on Aug. 23rd. I would like to make these two shows the focus of an informal CP club in the near future for all local CP enthusiasts so please consider this in your plans. Anthony Rae has been looking out for our interests in this project for several years and he would like to see more people participate. Perhaps we could all get together on the day the plants are set up for exchanging news and views about CP and starting new friendships. These biannual meetings just before each plant show may lead to other meetings and perhaps even field trips. I like to hear about your views on this plan and any ideas you might contribute to make this a success.

JOE MAZRIMAS would like to comment on his method for growing the Mexican Pinguiculas: Many of the Mexican *Pinguicula* species grown in alkaline soils as opposed to the U.S. species that grow in sandy-peat acid soils. There are some eight or nine species referred to as the orchid-flowered species because their flowers with long spurs resemble some of the tropical orchid flowers. These species with the exception of *P. gypsicola* are closely related and fairly difficult to distinguish taxonomically from one another. Adding to the confusion are the morphological changes that the vegetative portions of the plant goes through between summer and winter seasons.

The plants often grow at high elevations, 4-9,000 feet (1500-3000 meters) inhabiting cool banks and rocks in the mountains. They are often found in calcareous or alkaline soil in oak or pine forest and frequently on moist steep banks and ledges. The habitat is on vertical gypsum cliffs and ledges in partial sun or nearly full shade.

I grow these plants successfully in either pure vermiculites (medium grade) or perlite and vermiculite mixed 50-50. The medium should be first wetted with a solution of gypsum in water (1 tsp/quart) or lime in water (1 tsp/quart). The solutions are cloudy and not very soluble but that is fine because the small particles lodge into the vermiculite pores and slowly dissolve with time after each subsequent watering. This medium affords excellent drainage which the Mexican Pinguiculas require. They also grow in minimum light levels (about 10-20% of full sunlight) and like constant tem-

perature about 60-70°F (15-21°C).

The gypsum or lime treatment should be given about 3 times during the growing season for best results. Your plants will respond to this treatment by initiating new side buds and parent plants will grow larger and leaves will become thicker. I also notice that plants will respond to light sprayings of fertilizer solution such as fish emulsion or a weak dilution of Miracid® at about 4 month intervals during the growing season. Pollination of the large flowers is fairly easy to do. I slip the flat end of a toothpick inside the topmost portion of the funnel and scrape the pollen across the pistil on the way out. Capsules yield many seed when mature.

JOHN WATKINS (98 Earls Court Rd., London W8 6EG, England) reports that in his short note in the December, 1978 CPN (CPN 7 : 117-118), that the correct spelling for the butterwort is *Pinguicula lusitanica,* not "lusitanicum". Also, the CARNIVOROUS PLANT SOCIETY based in Great Britain has a new secretary to whom all requests for information, membership, etc. should be directed: Eric Binstead, 13, Grange Farm Road, Ash, Aldershot, Hamps., GU12 6SJ, ENGLAND. We have been following the activities of this organization through bulletins, minutes and its journal and all CP enthusiasts in Great Britain are urged to join this interesting and active group.

John also has noted that if a young plant of *Drosphyllum* topples over so that the stem is parallel to the ground (Ed: as frequently happens!), it will sprout shoots at each leaf node at right angles so that they will be perpendicular to the soil surface. However, rooting does not take place at these points. If the plant remains vertical, it will likely flower the second year and then probably die.

R. DOUGLAS WIGGINS, JR. (5834 N.E. Everett St., Portland, OR 97213) writes: I have been cultivating wingless fruit flies for carnivorous plant feeding; I find that the plants are vastly more vigorous with the additional food. However, it is often necessary to kill the fruit flies with CO_2 gas (difficult) or ether to insure that they do not crawl away from immature plants. I will offer cultures or wingless fruitflies and culture supplies for mail order sale. Write me for more information.

Short Notes

THERE'S NO TRICK TO GROWING UTRICS
Part 1: Terrestrial Species

by Bob Hanrahan
(560 Sherwood Ave., Satellite Beach, FL)

If someone asked you to name the fastest-moving carnivorous plant in the world, what would be your answer? Most likely you would say *Dionaea muscipula* or the Venus' Flytrap. Wrong! The correct response would have been to say *Urticularia* or the closely related genus *Biovularia.* Both of these genera are members of the family Lentibulariaceae. Now, can you name the other members of this most unusual family? Here's a hint: depending on the botanist, there are either 4 or 5 genera in this family. In case you have forgotten, they are *Biovularia, Genlisea, Pinguicula, Polypompholyx* and *Utricularia.* Many profession-

al botanists classify the two species of *Biovularia* as *Utricularia,* as the taxonomical differences are minimal.

As a family, the Lentibulariaceae encompass over one-half of all known CP species. Of the 250-plus species in the family, less than a dozen are commonly found in collections; of the lucky dozen, only one or two Utrics are generally included. This is really unfortunate for the genera as well as the collector. Terrestrial Utrics are the easiest of all the carnivores I have ever cultivated (here at WIP).

There are most likely less than ten collectors in the world who tend to specialize in these easy-to-grow plants. Possibly the reason for their apparent unpopularity is the scarcity of printed material to explain their culture and hidden flower charms. It is the intent of this short note to make a small dent into the forbidden and lost world of *Utricularia* information.

To simplify the process in helping you get started in cultivating Urics, I will provide in an outline form the basic growing factors that have been successful for me. I do not in any way profess to be an expert on their culture, just a dedicated amateur who has taken an interest in their superior trapping mechanism. Also, as an amateur botanist, I won't go into the complexities of the mechanical operation of the bladders or traps; this is best left to professional botanists such as Lloyd or Taylor.

SOIL MEDIUM: For the most part, Utrics are not too fussy about their growing medium. The most important consideration is to provide a medium that maintains a high degree of moisture at all times. I have found a simple mix of shredded long fiber moss and Canadian peat moss to be acceptable for nearly all varieties I have worked with. A 2-to-1 mixture of peat moss and fine sand or a shredded moss, peat moss and sand combination can be used. Live sphagnum moss is a preferred medium for the larger-growing species. Avoid live moss for the smaller varieties, as the moss quickly overgrows the plants and blocks out any available sun or artificial lighting. When acquiring a new species that I am totally unfamiliar with, I always try to gain as much information as possible about the area to which it is native. I then try to duplicate the natural soil conditions. After providing the closest approximation I can in soil structure, I then start some propagated plants out in a variety of soil mediums to determine if one is best. Usually, the results are the same and I determine that anything will work if other factors are maintained properly.

WATER LEVELS: As a rule, terrestrial Utrics are found only in wet or soggy locations. Some of the species are native to habitats that dry out periodically and have adapted to this alternation of water levels. Under normal light levels, the soil should be kept quite moist to soggy during the active growing seasons with pure water, low in mineral salts.

LIGHT: I believe home culture of Utrics is best with low light levels (less than 2,000 fc). This is about ¼ to 1/5 full sunlight on a clear day. I grow all of my species under greenhouse benches or along various levels of the vertical six level growing systems within the greenhouses. Indoor culture under fluorescent lighting is ideal as intensity levels generally never exceed 500 to 1,000 fc. Any of the commercial lamps (cool white, daylight, vitalight, etc.) will work equally well. The special indoor plant lights will provide a wider spectrum of light for your plants, but the cost of each lamp is greater than for a simple cool white unit. A very inexpensive way to provide the red and infrared portion of the spectrum is to place a small incandescent lamp (4 to 15 watts) near the growing plants. Be careful to monitor heat buildup as incandescent lamps do put out additional

heat. In any event, experiment with various light levels for your growing conditions.

TEMPERATURES: Ideal growing temperatures are between 22 and 30 degrees C. for all of the species I have had experience with. I let the nighttime temperature fall 5 to 10 degrees C. depending on species. As an optimum temperature for all varieties, a daytime maximum of 27 and a nighttime low of 18 could be considered ideal during the summer months. Winter growth at 15 to a low of 8 can be tolerated by nearly all species. I have had a number of the tropical species take a frost quite well with little or no damage. Remember, these are not delicate carnivores like a number of the droseras or pinguiculas that require precisely controlled conditions. Consider a number of the species like weeds; once you have them, they are difficult to eliminate if conditions are maintained properly.

HUMIDITY: *Utricularia* require an abundance of humidity like most fellow CP. When grown wet like they should be, humidity is generally no problem due to the evaporation of surface water in their soil medium. Humidity levels of 40 to 90% is adequate for all species.

DORMANCY: Aside from a few species, my Utrics as a rule do not requre as true a dormancy as many of the temperate *Drosera.* However, I have found that they do slow down and produce fewer leaves during the shorter winter months. *U. menziesii* dies back to its small corm during the dry season, which is a form of dormancy.

CONTAINERS: These plants can be grown in anything. However, I have noticed a preference for a light-colored container or one that permits light to penetrate into the soil. If grown in an aquarium or jar, the root system will huddle along the sides of the glass and propagate all along the margin. This is ideal as the bladders which form on the roots are clearly visible. For the most part, a small 2 to 3 inch container or pot is more than sufficient to provide for their needs.

TRANSPLANT REQUIREMENT: One of the most important facts about Utric culture is the nearly yearly transplant requirement. This is a vital trick I first learned about from Carl Forst, a long time Utric collector. It seems that once a culture flowers and fills its growing containers, it seems to decay slowly and die. Therefore, simply start out a new batch in a new pot with fresh soil and let the cycle repeat itself.

PROPAGATION METHODS: Here's where the fun starts. Just take a few leaves, roots and bladders and insert them into some fresh soil. Follow the other factors, and you're into Utrics. It's really that simple. They proliferate so fast from stolons that I have just about forgotten about other methods. I have leaf propagated them as well as from seed. But, by far the easiest and fastest is by the subculture method of division. If you receive or generate seed (which I have not found easy with some species), just start them out on a moist medium and keep them fairly warm — 25 to 30 degrees C. — and wait for germination. Some species will germinate in a month, while others have taken up to a year.

UTRIC AVAILABILITY: Being a mysrery genus, Utrics are not grown by most commercial plant nurseries because they are not in demand and cannot justify their expense when more lucrative crops can be produced in the same greenhouse. A few of the CP specialty nurseries do sell them, and generally at a modest price. I suggest that you try to contact another CPN'er who has a few species and who will help you get started. Since they do grow so fast, any true Utric collector will surely be glad to unload his surplus

plants in trade or as a pure donation to help you get started. The old myth of showing off one's growing talents by hoarding certain species of plants and trying to maintain the "only one in the world" is certainly old-fashioned with today's new CP ideals, as set forth by CPN and a few of the commercial companies.

TERRESTRIAL *UTRICULARIA* SPECIES OF INTEREST
(most desirable first)

1. *U. longifolia.* This is one of the largest and finest species. Produces large showy leaves up to 30 cm in length. Flowers large, up to 2 to 3 cm across with purple/lavender and yellow markings. Flowers with some difficulty. Grow very wet in the fall/winter period and let dry out slowly during the spring. Best grown in or with *Nepenthes* in tropical greenhouse situations.

2. *U. sandersoni.* Amazing little plant which produces an abundance of flowers which resemble a little "Bunny Rabbit". First popularized in the U.S.A. by CPN seed exchange coordinator Patrick Dwyer. Grown in similar environment as *D. capensis*. Very easy to maintain.

3. *U. pubescens.* A small species that produces small round umbrella leaves. A low grower that quickly covers a terrarium with its unusual leaves. Flowers are lavender, produced in the spring/summer growing period.

4. *U. tricolor.* A South American species that is easy to cultivate. Leaves are dichondra shaped and about 1 cm in diameter. Although I can guess why it is called tricolor, it has never flowered for me in over five years.

5. *U. dusenii.* A giant South American relative of *U. tricolor,* this species will produce a large (3-4 cm) leaf if grown under very low light levels and with a lot of water. Prefers to be partially submerged once established. Will grow up to 10 cm in height.

6. *U. prehensilis.* About the easiest species to cultivate. Produces a profusion of pretty little yellow flowers on twinning stems. Grows best in live or long fiber sphagnum moss.

7. *U. praelonga.* An interesting species that forms a variety of leaf shapes; short basel and long ribbon leaves to 15 cm. Likes to be submerged with water during the summer months to help support the long narrow leaves.

8. *U. calycifida.* Another of the *U. longifolia* variety. Smaller and more compact growth to 10 cm. Grow drier than *U. longifolia* but in the same medium, preferably live sphagnum moss.

9. *U. racemosa.* An Asian species that grows easily in any wet situation. Typical small leaved species.

10. *U. menziesii.* A rare and difficult to obtain species in the U.S.A. Native to western Australia. Forms a dormant corm in nature during the dry season to sustain it throughout the year. Best grown for me in vermiculite/peat mix. Let dry out during the winter months.

11. *U. dicotoma* and *U. novae-zealandica.* Similar species of easy growth. Nice lavender flowers readily produced in the spring to summer months.

12. *U. subulata* complex (*U. cornuta, U. juncea* and *U. subulata*). American species of very easy growth. Produces abundant seed that can quickly contaminate other nearby containers. Depending on species, yellow flowers with or without a long spur are produced during the spring to early summer.

(Received May 10, 1979)

CULTIVAR NAMING AND REGISTRATION

by James T. Robinson
Dept. of Horticulture
Purdue University
West Lafayette, IN 47907

For many of us the study of CP spans both botany and horticulture: botany, for studies of plants in natural settings, and horticulture, for growing plants for esthetic or research purposes. When finding the correct scientific names for CP we have used the *International Code of Botanical Nomenclature* as a guide and rightly so. But once we bring CP under cultivation and begin selecting plants for horticultural merit (cultivars), we leave the botanical realm and must use the *International Code of Nomenclature of Cultivated Plants — 1969* as a guide for applying correct cultivar names.

A cultivar is a selection from a species (or from a subspecies or variety) that has an unusual character (color, form, size, etc.). A cultivar may be originally found in nature or under cultivation and is perpetuated by man once it is recognized. The term cultivar is not recognized in the classification system of the Botanical Code, so one must turn to the Cultivated Plant Code for the rules of cultivar nomenclature.

An example of a cultivar is *Pyrus calleryana* 'Bradford', a tree with more symmetrical form than the species. This name follows the rules of the Code. Briefly, the Code specifies that cultivar names must be "fancy" (markedly different from a Latin botanical name) and they should be distinguished from botanical names by enclosing the name within single quotation marks. Capital initial letters must be used for all words of a cultivar name. A culivar name should consist of one or two words, but not more than three words. Use of the same cultivar name for plants of different genera should be avoided. In order for a cultivar name to be valid, it must be published along with a description and possibly an illustration. Finally, a cultivar name should be registered with a registration authority.

Frequently appearing in the Seed Bank and Want Ads sections of CPN are the names of plants that have been selected for various characters: *D. capillaris* (Gulf Coast Giant), *D. capillaris* (long leaf), *S. purpurea venosa* (pink flower) ("Horticultural variety Louis Burk"), *S. rubra* (Gulf), and many others. Since these plants are now treated as horticultural subjects, they should be properly named and registered according to the Cultivated Plant Code. I would like to suggest that CPN be appointed as the registration authority for all new CP cultivars. Thus plants such as *D. capillaris* 'Gulf Coast Giant', *D. capillaris* 'Long Leaf', *S. purpurea venosa* 'Louis Burk', and *S. rubra* 'Gulf' could be registered by CPN.

Woody plant cultivars, at present, are somewhat in a state of disarray (herbaceous cultivars are even more so, I understand). Following the Cultivated Plant Code is essentially voluntary, so many woody plant cultivars exist that have never been registered. Thus information about these cultivars is difficult to find and often different cultivar names apply to the same plant. A registration authority gathers as much information as possible for each name submitted for registration and so becomes a valuable source of information for anyone seeking to learn about a specific cultivar.

So far, the selection of CP cultivars has been limited enough that we can still gain control of the naming and reg-

istration process. At this point I would like to make a plea. *What is needed now is the complete cooperation of both commercial and private CP growers for the proper naming and registration of CP cultivars.* We have a fine opportunity to apply nomenclatural stability to the plants in our field of interest. Let's not let it escape us.

References cited:

Gilmour, J. S. L. et. al (ed.) 1969. International Code of Nomenclature of Cultivated Plants — 1969. Internat. Bur. for Plant Taxon. and Nomenclature, Internat. Assn. for Plant Taxonomy, Utrecht, Netherlands. (Available from The American Horticultural Society, Mount Vernon, Virginia 22121. Cost: $1.75)

Stafleu, F. A. et. al (ed.) 1972. International Code of Botanical Nomenclature. Int. Bur. for Plant Taxon. and Nomenclature, Int. Assn. for Plant Taxon., Utrecht, Netherlands.

General Reference:

Spongberg, Stephen A. 1978. Registration — its value to the maintenance and use of living collections. AABGA Bulletin 12(4):142-44.

Pinguicula Slides Available to CPN Readers

Readers will recall the CPN article by *Pinguicula* expert Dr. Jurg Steiger in which 27 color slides appeared (CPN 7 : 43-50). The author has generously given us permission to reproduce and sell sets of slides of the illustrations from that article in addition to 36 additional slides that have not appeared previously for a total of 63 slides in the set. The additional 36 slides are mainly habit and/or habitat shots of the entire plant. Besides being extremely useful for identification, they are beautiful pictures.

Many readers have asked about CPN setting up a slide sales and duplicating program and we are going to use this set as a pilot study, to see how it works out and what the problems and pitfalls are. The slides have been duplicated by Kodak, a more expensive process than the quicky corner developing services can offer, but well worth it since they are nearly indistinguishable from the originals. The charge for the set involves no profit for CPN or the co-editors, but represents duplicating and printing costs (the slide key), postage and some lesser administrative costs. Each set will be accompanied by a key with ancillary information, and a contract for the purchaser to sign and return to us. The contract is mainly a promise not to resell, or duplicate for resale, any of the slides. Jurg has generously allowed use in print, but requests the common courtesy of notification and a copy of the resulting paper or article, and of course proper citation.

To obtain your set, send a *check for $35.00* (made out to Donald Schnell) to: *DONALD SCHNELL, RT. 4, BOX 275B, STATESVILLE, NC 28677 USA.* Remember that the $35.00 fee just covers costs to us. The fee includes *surface* parcel post postage domestic or overseas, so overseas readers should allow a longer period for delivery.

A small number of sets are already in inventory for immediate delivery, so prompt orders will receive theirs sooner. If orders exceed our expectations and additional set duplications are required, there will be a four-week delay, so we advise immediate ordering.

This project is subsidized by private funds, so naturally a large inventory or open-ended continuation of this offer is not possible. Therefore, ALL ORDERS MUST BE RECEIVED BY DON SCHNELL BY 15 SEPTEMBER 1979.

If this project works out to your satisfaction and seems feasible to us after this trial, then perhaps we will be able to offer similar sets in the future as another CPN service to readers.

CPN SLIDE SET NO. 1 **Pinguicula** Slides by J. Steiger, U. of Berne, Insels. 14, CH-3010, Berne.

CPN No.	Steiger No.	Title	Origin	Place	Film	Date
1-1	ALP 72.06	P. alpina flower	Switz	ps	K-II	9-17-76
1-2	BAL 77.14	P. balcanica flower	Bulg.	ps	K-25	7-16-77
1-3	COR 70.153	P. corsica flower	France	ps	K-II	7-27-70
1-4	GRA 72.17	P. grandiflora flower	France	ps	K-II	5-28-70
1-5	GRA 70.78	" f. pallida flower	France	ps	K-II	5-28-70
1-6	GRA 74.26	" f. rosea flower	France	ps	K-II	5-23-74
1-7	GRA 70.105	cf. " /pallida/rosea flowers	4, 5, 6	ps	K-II	6-24-70
1-8	LEP 70.127	P. leptoceras flower	Switz.	ps	K-II	7-11-70
1-9	LON 76.17	P. longifolia ssp, caussensis flow.	France	ps	E-X	5-2-76
1-10	LON 70.144	" ssp. longifolia flower	France	ps	K-II	7-28-70
1-11	LON 76.16	" ssp. reichenbachiana flower	France	ps	E-X	5-2-76
1-12	LON 76.15	" " (color variant)	"	"	"	"
1-13	MAC 70.135	P. macroceras flower	Japan	ps	K-II	7-12-70
1-14	MAC 71.27	"	USA-CA	ps	K-II	8-30-71
1-15	MAC 71.16	" ssp. nortensis (nom. nud.)	USA-CA	ps	K-II	5-10-71
1-16	NEV 70.163	P. nevadensis	Spain	ps	K-II	7-31-70
1-17	VAL 70.78	P. vallisneriifolia	Spain	ps	K-II	6-10-70
1-18	VUL 76.34	P. vulgaris/f. bicolor/f. albida flow.	Switz.	ps	ACT18	6-26-76
1-19	VUL 70.177	P. vulgaris flower	Switz.	ps	K-II	8-16-70
1-20	VUL 72.01	P. vulgaris flower	USA-MI	ps	K-II	5-21-72
1-21	VUL 70.134	P. vulgaris f. bicolor flower	Switz.	ps	K-II	7-11-70
1-22	HYB 72.49	P. leptoceras x vulgaris	Switz.	ps	K-II	7-12-72
1-23	GYP 70.184	P. gypsicola flower	Mexico	ps	K-II	8-29-70
1-24	HIR 76.43	P. hirtifolia flower	Italy	ps	ACT18	7-2-76
1-25	LUS 75.40	P. lusitanica flower	Ire.	ps	K-64	8-11-75
1-26	MOR 70.195	P. moranensis flower	Mexico	ps	K-II	8-29-70
1-27	MOR 70.196	" (3 color variations) flower	Mexico	ps	K-II	8-29-70
1-28	DIV 70.32	cf.—grandiflora, grand. f. pallida, leptoceras, villosa, vulgaris, vulg. f. bicolor, corsica, macroceras (Japan)		ps	K-II	7-11-70
1-29	LEP 70.175	P. leptoceras (color variant) flower	Switz.	ps	K-II	8-7-70
1-30	ALP 72.05	P. alpina	Switz.	oh	K-II	5-22-72
1-31	ALP 75.15	P. alpina	Switz.	oh	3M	4-37-75
1-32	ALP 77.07	P. alpina	Switz.	oh	K-25	6-17-77
1-33	ALP 78.04	P. alpina	Switz.	oh	EPD	5-14-78
1-34	BAL 78.35	P. balcanica	Bulg.	c	EPD	7-23-78
1-35	COR 72.26	P. corsica	France	c	K-II	6-25-72
1-36	GRA 72.11	P. grandiflora	France	c	K-II	6-4-72
1-37	GRA 74.24	"	France	c	K-II	5-23-74
1-38	GRA 72.12	" ssp. rosea	France	c	K-II	6-4-72
1-39	HIR 76.53	P. hirtiflora	Italy	c	K-25	8-14-76
1-40	ION 75.01	P. ionantha flower	USA-FL	c	Fu	1-2-75
1-41	LEP 78.44	P. leptoceras	Switz.	oh	EPD	8-6-78
1-42	LEP 78.45	"	Switz.	oh	EPD	8-6-78
1-43	LEP 78.48	"	Switz.	oh	EPD	8-6-78
1-44	LON 72.13	P. longifolia ssp. caussensis	France	c	K-II	6-4-72
1-45	LON 78.26	" ssp. longifolia	France	c	EPD	7-14-78
1-46	LON 74.25	" "	France	c	K-II	5-23-74
1-47	LON 76.05	" ssp. reichenbachiana	France	c	E-X	4-19-76
1-48	LUS 75.31	P. lusitancia	Ire.	c	K-25	6-16-75
1-49	MAC 76.45	P. macroceras	USA-AK	c	ACT18	7-11-76
1-50	MAC 71.10	" ssp. nortensis	USA CA	oh	K-II	5-7-71
1-51	MAC 71.12	" "	USA CA	oh	K-II	5-7-51
1-52	RAM 73.20	P. ramosa	Japan	c	K-II	4-16-73
1-53	VAL 72.20	P. vallisneriifolia	Spain	c	K-II	6-5-72
1-54	VAL 72.22	"	Spain	c	K-II	6-5-72
1-55	VAL 76.54	" — leaves and hibernacula	Spain	c	K-25	8-14-76
1-56	VIL 75.17	P. villosa	Finl.	c	K-II	5-11-75
1-57	VIL 77.03	"	Finl.	c	K-25	6-11-77
1-58	VUL 72.34	P. vulgaris	Switz.	oh	K-II	7-2-72
1-59	VUL 72.44	P. vulgaris	Switz.	oh	K-II	7-9-72
1-60	VUL 77.16	P. vulgaris	Switz.	oh	K-25	7-10-77
1-61	VUL 77.26	"	Switz.	oh	K-25	7-22-77
1-62	ALP 77.27	P. alpina/vulgaris leaves—alp. narrower	Switz.	oh	K-25	7-22-77
1-63	LEP 74.42	P. leptoceras x vulgaris (natural..	Switz.	c	K-II	6-7-74

JAPANESE *DROSERA* HYBRIDS

by Isamu Kusakabe
5 14-6, Chitosedai
Setagaya-ku, Tokyo 157
JAPAN

This list was kindly compiled for CPN by Mr. Isamu Kusakabe. It is a current listing of the Drosera hybrids produced by Mr. Nagamoto.

THE LIST OF ARTIFICIAL HYBRID DROSERA
(Cross-breeder: Jiro Nagamoto)

			Date of Cross
1) D. X Nagamoto	anglica (Sarobetsu, Hokkaido)	X spathulata ssp. tokaiensis (Mt. Shinoda, Ohsaka Pref.)	Jun. 24, '71
2) D. X "watari" var.	anglica (Sarobetsu, Hokkaido)	X spa. ssp. spathulata (Watari, Miyagi-Pref.)	Jun. 9, '74
3) D. X Nagamoto var.	anglica (Sarobetsu, Hokkaido)	X spa. ssp. spathulata (Tasmania, White fl.)	May 10, '76
4) D. X anfil	*an*glica (Sarobetsu, Hokkaido)	X *fil*iformis (Brunswick, N.C.)	Jun. 2, '76
5) D. X anterm	*an*glica (Sarobetsu, Hokkaido)	X in*term*edia (München Bot. Gdn)	Jun. 12-14, '73
6) D. X anpill	*an*glica (Sarobetsu, Hokkaido)	X ca*pill*aris (München B. G.) (as D. burkeana)	Jun. ? , '74
7) D. X linglica	*line*aris (Ontario, Canada)	X an*glica* (München B. G.)	May 22, '76
8) D. X linpill	*line*aris (Ontario, Canada)	X ca*pill*aris (Mississippi)	May 22, '76
9) D. X linthulata	*line*aris (Ontario, Canada)	X spa*thulata* ssp. spathulata (Tasmania, White fl.)	May 22, '76
10) ————	capillaris (Mississippi)	X intermedia (München B. G.)	Jun. 4, '77
11) ————	rotundifolia	X capillaris	Jun. ? , '76

Remarks:

It is possible that *D.* X *anterm* & *D.* X *anpill* show abnormal growth when they grow new leaves in the spring. However, they will grow well before long.

A Search for Mexican Pinguiculas

by
Marc Beckstrom
(901 N. Woods Ave., Fullerton, CA 92632)
Gordon Blanz, photographer
(1409 Buttercup Lane, Colorado Springs, CO 80907)

In August of 1978 we drove to Oaxaca, Mexico in search of *Pinguicula*. We stopped at several places along the way, but found nothing. As soon as we passed Oaxaca and started into the surrounding mountain-side, it didn't take long before we found our first clump of Pingiculas: about 12 plants in full bloom, growing on gravelly red clay, about 50% shaded. See plate 1.

As we drove on, the road took us over a small pass near Ixtlan, and stopped near an old logging camp just beyond the pass. This area was quite cool and damp, and the pine trees were so thick that no direct sun light filtered through to the ground. After a fairly extensive search we found some very nice Pinguiculas on the southeastern slope below the road. The flowers were light purple and fairly slender; the leaves were oval-shaped instead of round as were all the other plants we had observed. Further on, just north of Ixtlan, we found about a hundred Pinguiculas growing on nearly vertical moss-covered rocks.

One startling thing occurred during our drive through the fog forest. From the car we could see an extremely large flowered Pinguicula growing right on the side of the moss-covered trees. See plates 2 and 4. The flowers were the size of a quarter and dark pink in color, with an unusually wide tail. .5 Km's further on we found the same plants growing by the thousands on a vertical incline along the side of the road. These were concentrated in a small area about 30 meters long. See plates 5 and 6.

The fog forest had extremely dense foliage and was constantly wet with fog. The dead wood on the ground, although it looked firm was completely decayed and gave way to our weight. The trees were so covered with moss that the trunks could not be seen even with close observation.

One very important observation I would like to mention at this time about the Oaxaca mountain area, is the relationship between Bromeliads and Pinguiculas. We noticed that when there was a heavy concentration of Bromeliads there were always Pinguiculas growing somewhere nearby, which is probably due to a heavier concentration of water in that particular area.

Upon leaving Oaxaca, we drove past Mexico City to Toluca, and from there south towards Ciudad Altamirana. We found some very nice stands of Pinguiculas growing only on the west-facing slope alongside the road. The plants were unusual with respect to the wide color range of the flowers. The flowers ranged in color from deep purple to violet, pink and pure white, all growing side by side. I did notice that the shapes of the purple and white flowers were different. The petals on the purple flower are square at the tips and the petals on the white flower are round at the tips. See plate 3.

Although there are reports of Pinguiculas growing north of Toluca, we were unable to locate any.

In my opinion it is well worth one's time to spend a month in Mexico, to observe and study the Pinguiculas where they grow so abundantly and in such varied form. The Pinguiculas are in full bloom by late August continuing through September. (Received May 1, 1979)



Plate 1



Plate 2



Plate 3



Plate 4

Photos by Gordon Blanz



Plate 5

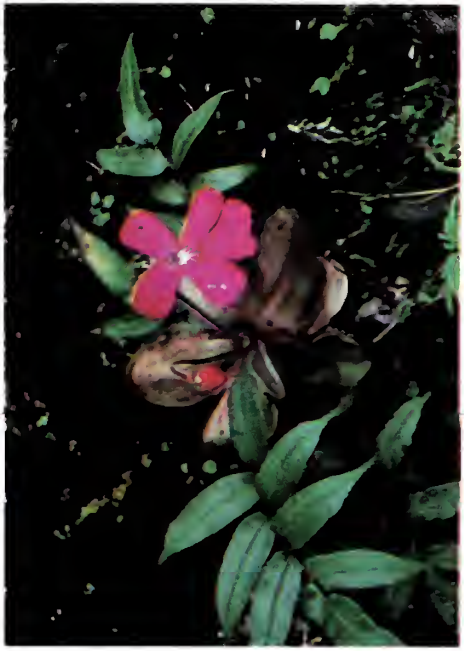


Plate 6



Fig. 1
Corolla removed

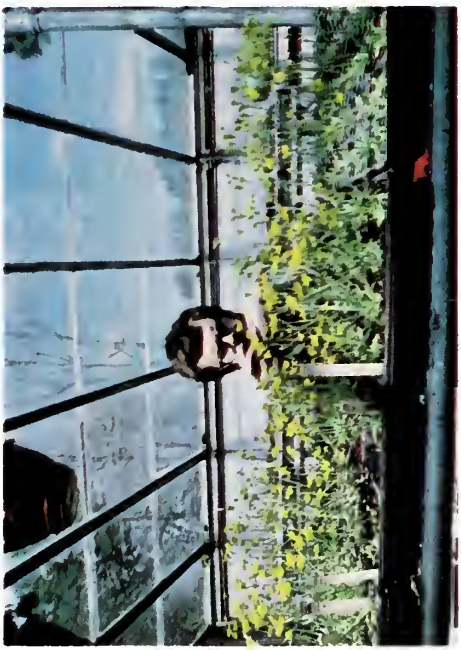


Fig. 2
Bill Carroll pollinating
Pinguicula lutea

(Please turn page to view)

PROPAGATING *PINGUICULA LUTEA*

by Bill Carroll
(Botany Dept., Carolina Biological Supply Co., Burlington, NC 27215)

The propagation of carnivorous plants has been my major interest for the last five years. When I started studying butterworts in 1976, nothing seemed to keep the plants growing. After nearly two years of effort, I developed a successful soil mix and a method for propagating *Pinguicula lutea.*

THE SOIL MIX

A mixture of two parts peat moss and one part vermiculite is used. When sowing seed, screen the mix to remove large particles.

The peat moss used is the brown fibrous type sold in bales at garden centers. It is often labeled Sphagnum Peat Moss or Canadian Peat Moss.

Vermiculite is a micaceous mineral which contains small amounts of magnesium and potassium. The plate-like, layered structure of vermiculite holds nutrients and gradually releases them.

Perlite may be used in place of vermiculite when transplanting *P. lutea.* However, its lightweight particles float in water and could interfere with the growth of seedlings by covering them up. Perlite is a volcanic silicate and contains no nutrients, nor does it hold nutrients like vermiculite.

POLLINATION

The flower is structured in a way that seems to prevent self-pollination. Two anthers are attached below the stigma and are covered by a small flap (Fig. 1, corolla removed). I have observed honeybees going into butterwort flowers, and upon backing out, take their forelegs and rake pollen off their backs, depositing it on their hind legs. Some pollen remains on the insect's back. When the bee enters another flower, the pollen is pressed on the stigma, completing pollination.

In order to hand pollinate the butterwort flower, it is necessary to remove the corolla. Gently hold the stem with one hand. Using the other hand, grasp the flower between thumb and forefinger. Slowly pull upwards on the flower until it breaks free. An alternate procedure is to tear away the flower in pieces so that the pistil is fully exposed.

A pair of fine pointed forceps is used to remove an anther. The pollen is then pressed gently onto the stigma. Another method is to use the flattened end of a toothpick to scrape out a small amount of pollen from beneath the flap. Gently push the pollen onto the stigma.

Although self-pollinated flowers will produce viable seed, cross-pollination of different plants results in more and larger seed. Have patience; it may taken seven weeks for the seedpod to mature, split open, and reveal its cache of tiny black seeds.

COLLECTING SEED

To collect seed, tip the seedpod over onto a sheet of paper or a shallow dish. Firm tapping will dislodge the seeds. The entire stem and seedpod are easily removed from the plant by pulling steadily on the stem with a sideways motion. If seed are to be stored, they should be air dried two or three days. This removes excess moisture and thus prevents molding. Store seed in a closed container such as a small glass vial or plastic prescription bottle. At room temperature seed viability is still good after twelve months.

SOWING SEED

Sow seed on a smooth surface of two parts brown fibrous peat moss and one part fine vermiculite. Do not cover the

*Preceding page

seed with soil. The soil mix is moistened beforehand using *Miracid*® at the rate of one-fourth teaspoon per liter of water. *Miracid*® is a water soluble fertilizer used for acid-loving plants. It is usually sold at garden centers. Use water that is free of chemical additives such as chlorine and fluoride.

Cover the container with clear plastic or glass to hold in humidity and aid germination. Seedlings emerge in several weeks and soon begin to form the familiar rosettes. Gradually remove the cover over several days so that the seedlings adjust to less humidity.

TRANSPLANTING

Transplanting may be done at any size, but is more easily accomplished when the seedlings reach one centimeter in diameter. When transplating, the same soil mix is used although the strength of *Miracid*® may be increased to one-half teaspoon per liter of water. Settle the soil around the plants by careful watering.

GROWING CONDITIONS

P. lutea has a wide range of tolerance for light and heat. The plants grow best in bright light, but will do about as well in partial shade. Direct sun is not necessary.

Winter temperatures in the greenhouse range from 13°C (55°F) at night to over 27°C (80°F) some days. The plants continue to grow all winter; no dormant period has been observed. In their native habitat, summer temperatures often exceed 38°C (100°F).

Humidity is important for butterworts. A terrarium will provide an idea environment in the home. For the greenhouse, set pots in a tray of water about two or three centimeters (one inch) deep. Add more water only when the tray is empty of water, but before the soil becomes dry.

FERTILIZING

In the greenhouse, *P. lutea* is watered with a solution of one-fourth teaspoon of *Miracid*® per liter of water, about every sixty days. This maintains good growth and bright green color. The solution is poured into the tray in place of a regular watering.

Other carnivorous plants that benefit from *Miracid*® include sundews, pitcher plants and Venus flytraps.

REPOTTING

Repotting may be necessary as the plants grow older. To do this, place one hand over the plant and with the other hand hold the pot. Turn the pot upside down and tap the edge against a solid object such as a table or kitchen sink. The plant and soil should slide right out.

Carefully remove old soil, dead roots and leaves.

Use the same soil mixture as for transplanting and settle the plant in with a good watering. Keep the plant in a shaded area for several days while new roots develop.

FLUORESCENT LIGHTS

P. lutea does very well under two cool-white fluorescent tubes. Twelve hours of light is sufficient to maintain healthy plants. The lights should be approximately ten to twenty centimeters (four to eight inches) above the plants.

Starting seed under fluorescent lights speeds germination. Put the pot or tray within ten centimeters (four inches) of the lights.

TEST TUBE PLANTS

Butterworts are well known for producing plantlets on injured or detached leaves. Under natural conditions, most of the leaf decays before very many new plants get started. With the laboratory culture method, a sterile environment prevents disease organisms from infecting the plant leaf tissue. A nutrient enriched medium supports growth as the piece of leaf freely produces large numbers of plantlets.

At Carolina Biological Supply Company, I have produced tissue cultured plantlets of *P. lutea* and *Dionaea muscipula* for about two years. Both have been

(Please turn to page 71)



Drosera schizandra
in habitat



Drosera prolifera
in habitat



Drosera adelae in habitat
near Cardwell, N.Q.



Russell River above Windin Falls.
Habitat of *Drosera schizandra.*

(Please turn page to view)

Rainforest *Drosera* of North Queensland

by Dr. P. S. Lavarack
National Parks and Wildlife Service
P. O. Box 190, North Quay, Australia 4000

Introduction

Most species of the Droseraceae are plants of open well-lit environments, often growing in soil which is at least seasonally waterlogged.

The genus has reached its greatest development in temperate parts of the Australian continent with upwards of 40 species occurring in a limited area in south west Western Australia. In tropical Australia 9 species are recorded. Four of these (*D. burmannii* Vahl., *D. spathulata* Labill and *D. peltata* Smith) are widespread outside Australia, while one (*D. petiolaris* R. Br.) also occurs in New Guinea. Another (*D. banksii* R. Br.) apparently does not occur outside Australia, but is widespread across the north of the continent.

The remaining three species — *D. adelae* F. Muell., *D. schizandra* Diels and *D. prolifera* C. T. White — are unusual in that they grow in hot, humid, shaded rainforest conditions. All three species show adaptation to low light situations in that the normally rather small leaves of most members of the Droseraceae have been replaced with large broad leaves.

Distribution

The rainforest Droseras are found in the area of north Queensland from about Ingham (18° 42's) north to Cooktown (15° 28's) in the narrow coastal region extending about 20 km inland. This is an area of high rainfall and relatively high mountains close to the coast. It encompasses the largest and richest area of rainforest on the Australian continent and contains many endemic species. Within this range the three *Drosera* species are not widespread and show a most interesting distribution.

Drosera adelae has been recorded only on Hinchinbrook Island and adjacent areas of the mainland. It grows in shade, but occasionally in sun, in beds of moss along creek banks at low altitudes.

Drosera schizandra has been recorded from only one or two streams in the western foothills of the Bellenden-Ker range at about 700m altitude. It grows on mossy creek banks in relatively cool, very shady rainforest conditions, usually under a canopy of ferns and sedges.

Drosera prolifera has been recorded on Thornton's Peak and the streams which rise on this mountain. It has been noted at varying altitudes from sea level to 1400m.

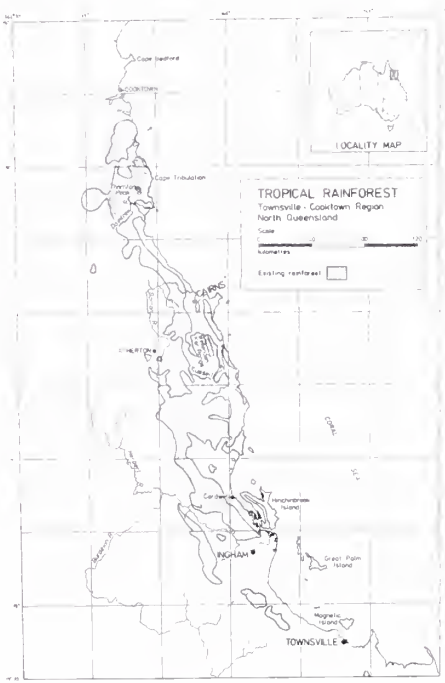


Figure 1

The distribution of these species is illustrated in Fig. 1. Other Droseras in east and north Australia show wide overlapping patterns of distribution but the three

rainforest species are unusual in that the distribution in each case is very small and quite distinct from the others. This is surprising as there is a more or less continuous range of apparently suitable habitats in the intervening areas.

Ecology

Although all three species are found in the tropics, two at least (*D. schizandra* and *D. prolifera*) occur at moderate elevations where night-time temperatures in winter often fall to 10°C or lower. Day temperatures even in winter would usually reach at least 20°C. All three species grow beside streams in predominantly shady conditions with a still atmosphere. It is likely that the habitat immediately surrounding the plants is less variable than that in the forest. It is also likely to be cooler as in most cases the streams rise at high altitudes and are fast flowing.

Communities of all three species suffer inundation for several periods of up to a day or two each year by fast-flowing water. While the period between December and April is regarded as the wet season, the area in which these plants grow is subject to heavy rain at any period of the year. They have been observed growing on permanently moist rocks, in beds of moss and in moist sandy soil associated with fast-flowing water.

In summary, the conditions in which these rainforest species of *Drosera* grow are warm, humid with relatively little fluctuation in temperature and moisture, in areas of low light intensity and on a welll drained substrate.

Drosera prolifera C. T. White — History

While *D. adelae* and *D. schizandra* are rare plants, their existence has been well known since 1864 and 1906 respectively. *D. prolifera,* however, has been something of a mystery since its original collection by L. J. Brass in 1937 on Thornton's Peak and subsequent description by C. T. White (White 1940). It was again collected in 1940 by Flecker but was apparently not seen again for 33 years until it was collected by Stocker, again on Thornton's Peak.

The author in 1973 saw plants of what must have been this species near the Roaring Meg, a stream which rises on Thornton's Peak. These plants were growing at about 500m elevation, considerably lower than the previous collections near the summit of the mountain (1400m). In June 1977 B. Gray of Atherton collected a few plants on the headwaters of Noah Creek, another stream rising on Thornton's Peak. He reported other occurrences in the same area. Some plants from this collection were grown by the present author who searched for this species in June 1978 and was successful, collecting specimens from a tributary of Noah Creek at about 200m altitude. As far as can be ascertained these are the only recorded sightings of this species.

The plants seen at Noah Creek were growing most prolifically along rock ledges underneath and beside a waterfall in a thin layer of organic material and mud held in place largely by the plants themselves. The area was exposed to a little early morning sun.

As the only figure of *Drosera prolifera* in existence is a sketch in the "Victorian Naturalist", a figure is included here. This figure (Fig. 2) is made from material now in the Queensland Herbarium.

Relationships

There appears little doubt to the present writer that the three species are closely related. *D. adelae* and *D. schizandra* are placed by Diels (1906) in the section Arachnopus along with *D. indica.* C. T. White in describing *D. prolifera* created a new section (Prolifera) to include this species stating: "The affinities of this section lie with Section Arachnopus Planchon, but differ markedly in the rotund long petiolate leaves." (White, loc. cit.) The other obvious difference lies in the production of small vegetative buds on the apex of the old flowering scape.

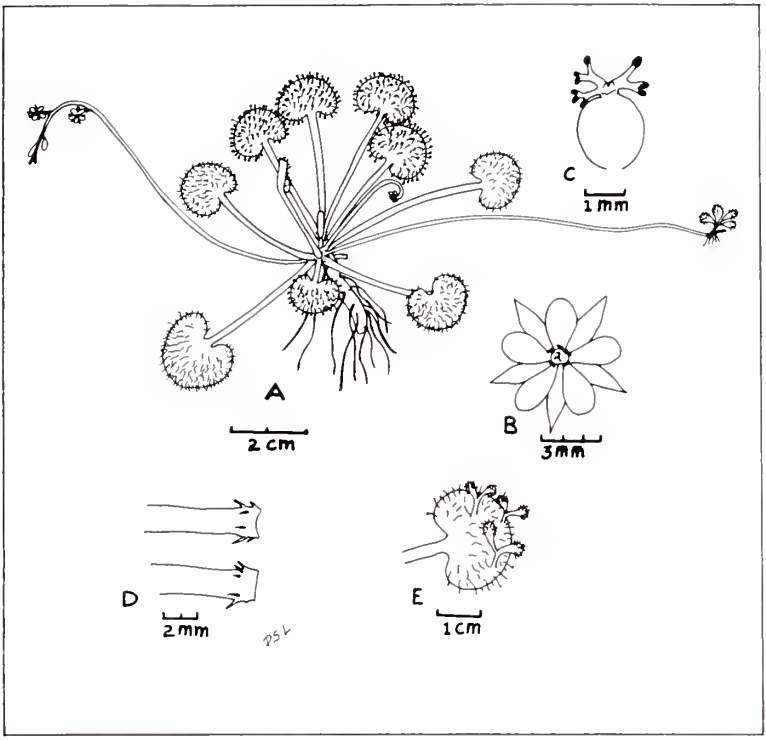


Fig. 2 *Drosera prolifera* C. T. White

A. Habit
B. Flower
C. Styles
D. Leaf base
E. Buds from leaf

The difference in the leaves is not as clear-cut as White suggests as close observation of colonies of *D. adelae* and *D. schizandra* will reveal that juvenile plants of both these species have leaves which are rotund and clearly petiolate. Very small plants of all three species are indistinguishable. The flowers of the three species also are very similar. In fact *D. schizandra* and *D. adelae* resemble *D. prolifera* much more closely than *D. indica* with respect to the structure of the styles and stamens. The stamens in *D. prolifera* are broad, club shaped, almost petaloid with the apex a similar colour to the petals. The anther cells are widely separated as is the case in *D. schizandra* and *D. adelae*. Figure 3 shows a comparison between these four species.

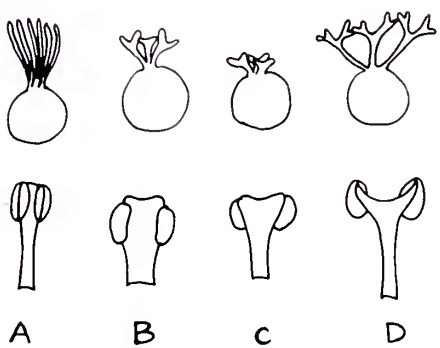


Fig. 3
Stamens and styles of four species of Drosera compared. A - *Drosera indica;* B - *D. prolifera;* C - *D. adelae;* D - *D. schizandra*

Thus these three species appear to the present author to form a natural, closely related group. I therefore propose that the Section Prolifera should be abandoned and *D. prolifera* C. T. White should be included in the Section Arachnopus.

The position of *D. indica,* included in Arachnopus by Diels, is less certain, but it would appear to be less closely related to *D. adelae* and *D. schizandra* than is *D. prolifera.* Obviously some careful study is needed to determine a natural system of classification for these and related species.

The origin of these three species raises some interesting problems. Each species is apparently restricted to a small area, in the case of *D. prolifera* and *D. schizandra* a single catchment; in the case of *D. adelae* to a small area which possibly constituted a single catchment in a time of lower sea levels.

It has been shown (Kershaw, 1974) that the climate in this region is emerging from a period of high rainfall. It is possible that the present rainforest distribution may have been much more discontinuous. Therefore the distributions of these species may not always have been linked by suitable habitats. It is consistent with present day knowledge to postulate an original ancestral species, widespread in a previous period of recent geological history. The continuous range of this ancestor species was then interrupted by one or more dry periods and these now-isolated communities proceeded to evolve along different lines in response to slightly different environments. As there are now no obvious mechanisms for long range dispersal, the species have remained isolated.

REFERENCES

Diels, L. 1906. Droseraceae *in* A. Engler, Das Pflenzenreich Heft 26.

Kershaw, A.P. 1974. A long continuous pollen sequence from north eastern Australia. *Nature* 251: 222, 223.

White, C.T. 1940. A new type of Sundew from north Queensland. Victoria Naturalist 57: 94,95.

(Received 11/14/78)

*On Growing *Drosphyllum Lusitanicum*, The Portuguese Dewy Pine

by Adrian Slack

The Portuguese Sundew, or Dewy Pine as it is called in that country, is a very different plant from other carnivorous plants. With its semi-shrubby habit, crowded linear red-glanded leaves, and clustered corymbs of 1″ wide bright yellow 5 petaled flowers, it is an attractive plant, and it is not surprising that many people have tried their hand at growing it. There have been many instant failures amongst which must be included some of my own early attempts, while "success" has not often lasted for more than 2 years. Indeed, a belief has grown up amongst some growers in the U.S.A. that the plant is a biennial. It does, in fact, grow to a ripe old age in its native homes in S. Spain, Portugal and Morocco, where it is generally a plant of dry rocky hills in coastal regions, and therefore requires a rather different growing technique to any employed on your other plants. Here is one method that works.

First, its basic hates are: wet collar, poor drainage, poor light and, especially, root disturbance. Never transplant it; it may survive this maltreatment for months, only to make a sudden departure; a strange truth only discovered after many trials and losses. If you mist your

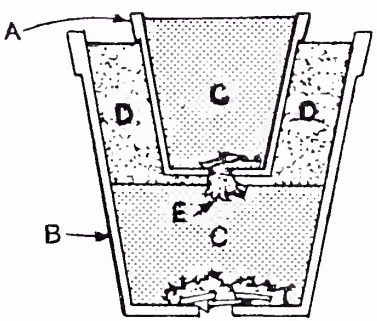
*Reprinted from the CP Society Journal of Great Britain (with permission from author)

other plants, be sure to protect this plant with a canopy when doing so.

Always start from seed rather than from a plant. In this way you know that everything is right from the start. It is important to sow in spring, thus giving your stock a chance to develop woody stems by autumn. All your pots *must* be of clay, this method depending upon their porosity. Take a 4½" clay pot; and stick a protruding wick of sphagnum moss in the drainage hole. I like to put one large crock over this, allowing some sphagnum to be just visible to its side. A little sphagnum is now placed to form a thin cover on the crock. Fill the pot to within ¼" of the top with a compost of 2 parts of lump-free granulated moss peat, 2 parts John Innes Potting Compost No. 2, and 1½ parts of well washed sharp horticultural sand (not grit). Firm it, but not as if you were making a cement block!

Now sow two or three seeds in the pot. Germination is usually good unless the seed is old. Sow these in the central area, but ¾" apart, and they should be ⅛" deep. Gently firm. Place the pot in 1½" of soft water till the surface becomes damp. Allow it to drain, and place a sheet of glass over the top to cut down evaporation, placing a dark object over this to completely cut out the light. I never apply bottom heat, finding my coolhouse temperature, which has a minimum of about 47°F at that time, adequate for germination within about 6 weeks time. The pot is regularly inspected, and if there is any sign of the compost becoming dry, it is watered using the immersion technique described — one must never water from the top. The moment the first seedling germinates, the glass is removed. The pot is now placed in a very sunny position in the greenhouse close to the glass. One has to be careful with the watering. This is not a bog plant, and will not thank you if you stand the pot permanently in water, on the other hand it will be fatal if you allow the pot to dry out. If you are out for the day, always water it if you think there is a chance of its drying out while you are away, and always by immersion. If more than one seed germinates, retain only one, carefully tweeking out the unwanted ones without disturbing your selected one.

When the young plant is in its sixth leaf the root system is sufficiently developed to proceed with the next stage. Select a 7" or 8" pot and place three or four potsherd crocks over the drainage hole, and lightly cover these with sphagnum moss. Over this, sufficient of the above specified compost is placed and firmed, so that when the 4½" pot, complete with plant, is placed upon it, the rim of this pot is ½" above that of the larger. Now put in a thin layer of sphagnum moss over this, so that when the smaller pot is again placed firmly on it, it is now about ¾" proud of the larger. Hold the 4½" pot in the centre of the larger one, and pack more sphagnum moss between the sides of the two to within ⅓" of the rim of the latter. Now water the sphagnum moss between the pots well, and place the pot in a sunny position in the coolhouse near the glass.



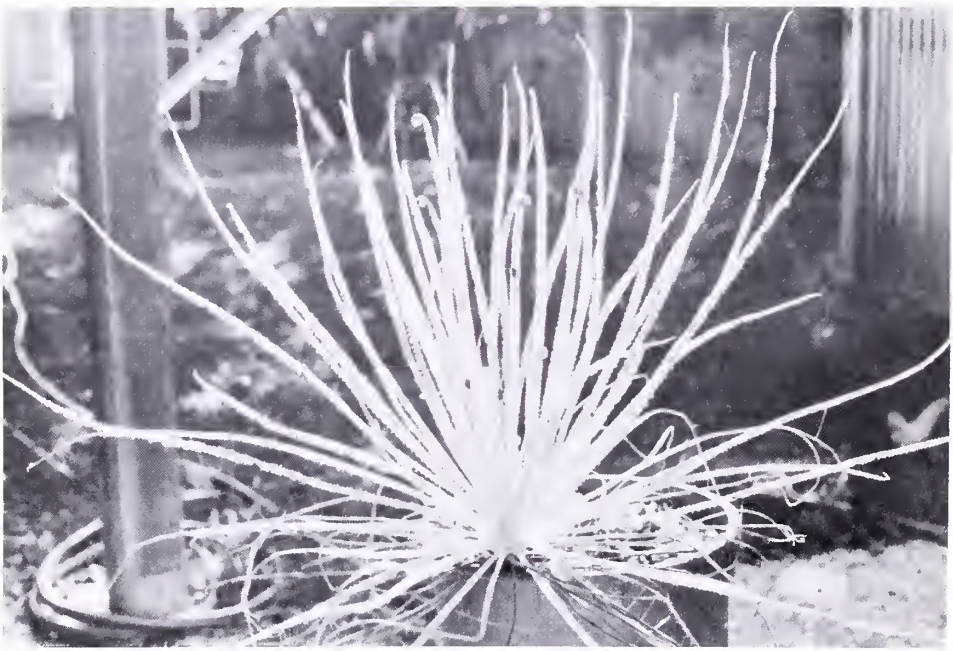
A 4½" pot
B 7" pot
C compost
D sphagnum
E sphagnum wick

The sphagnum acts as a reservoir which allows only sufficient water for the plants needs to percolate through the permeable walls of the inner pot, leaving its raised top, and thus the base of the stem, relatively dry. Normally one should only water via the sphagnum, without wetting the surface of the centre pot. However, when summer growth becomes vigorous, and the weather is hot, it does no harm to apply water to both pots when the plant is mature. Never do this after September, or in cool summer weather. One has to be especially careful not to overwater the moss during the period of minimal growth which follows flowering, and when the plant is at its most delicate. The time to water is when the moss feels dryish but not crisp; however, one needs to be extra observant then, for it the roots are allowed to dry out at any time the plant will almost certainly die.

My first "success" lived for something in excess of seven years. In those days I



Drosophyllum lusitanicum
Photo by Joseph A. Mazrimas



Drosophyllum lusitanicum
Photo by Joseph A. Mazrimas

used almost the same method, but the outer pot was filled entirely with sphagnum without any compost. I examined this after the plant died, and found the moss below the smaller pot to be filled with black drosophyllum root, and it seemed fairly evident that the nutrient in the smaller pot must have become exhausted. For this reason I give my plants the secondary dose of compost in the base of the outer pot, and as those members who saw the 4 year plus specimen at our Royal Horticultural Society Show exhibit will realize, this method does seem to work. Another of our members, Timothy Heneage, decided to try the same technique, and I must admit, with reluctance, his best plant is rather larger than mine!

Review of Recent Literature

Dixon, K. W. and J. S. Pate. Phenology, Morphology and Reproductive Biology of the Tuberous Sundew, *Drosera erythrorhiza* Lindl. Aust. J. Bot. *26* : 441-454 (1978)

D. erythrorhiza grows near Perth, Western Australia from autumn to late spring and aestivates by underground tubers from Nov. - Feb. Each tuber sends up a stem terminated at the soil surface by a rosette of parent tuber during mid-winter. Other daughter tubers are produced higher up the stem, extended radially from shoots that swell terminally to produce tubers.

D. erythrorhiza rarely produces flowers and only after specific fire requirements and propagation from seed is extremely rare. Reproduction is mainly by daughter tubers whose number varies with the clone and undergoes a cyclic rejuvenation over a sequence of seasons. There are periods of intensive daughter tuber production alternating with periods of minimal reproduction.

Johnson, P. H. 1979. Venus's Flytrap. Gardening 1 : 34-39.

A good popular article on the plant, written mainly from a conservation angle. There is one text error: Seeds of *Dionaea* do NOT require stratification prior to germination since the seed matures in late spring to early summer. The article also features nine full color photos by Donald Schnell, Jerome Wexler and David Thomas.

Murry, R. E. and L. E. Urbatsch. 1979. Preliminary reports on the flora of Louisiana. III. The families Droseraceae and Sarraceniaceae. Castanea 44 : 24-27.

This report documents the occurrence of Sarracenias (*S. alata, S. purpurea* and *S. psittacina*) and Droseras (*D. capillaris, D. brevifolia* and *D. intermedia*) and distributions (dot maps) as they naturally occur in the state.

Pate, J. S. and K. W. Dixon. Mineral Nutrition of *D. erythrorhiza* Lindl. with special reference to its tuberous habit. Aust. J. Bot. 26 : 455-464 (1978)

The parent tuber supplies more than 80% of the nitrogen, phosphorus, potassium, magnesium, sodium and zinc in the leaf rosette while calcium is almost unchanged. The new season's tubers are also very efficient in acquiring these elements especially phosphorus

and nitrogen from the rosette and from insects trapped by the plants. The habitat soil that was enriched in these elements produced tubers with higher levels of elements. Growth on full mineral culture solution or distilled water produced tubers with low levels of minerals. The tuber mineral composition varied greatly between habitats, especially in relation to phosphorus, nitrogen and zinc. It was not clear exactly what effect a previous season's fire had on the tuber composition since results were too variable.

Rooney, S. C. et. al. 1979. *Drosera linearis* Goldie rediscovered in Crystal Maine. Rhodora 81 : 145.

Crystal Bog in Aroostook County, Maine is the only herbarium location for *D. linearis* in Maine, there having been seven collections and the last of these in 1935. In June, 1978, two stands of about one hundred plants each were rediscovered in this same location by the authors. They were accompanied by *D. rotundifolia* and *D. intermedia.*

Schnell, DE. 1979. A critical review of published variants of *Sarracenia purpurea* L. Castanea 44 : 47-59.

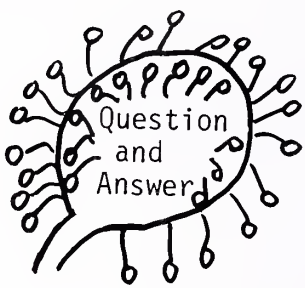
This is the full paper of which a lengthy summary appeared previously in CPN (CPN 7 : 74-76, 1978). The paper should be consulted for arguments supporting the conclusions of that summary. (Reprints: DE Schnell, Rt. 4, Box 275B, Statesville, NC 28677).

Schnell, DE. 1978. *Sarracenia rubra* Walter: Infraspecific nomenclatural corrections. Castanea 43 : 260-261.

The author formally names subspecies proposed in his previous paper, "Infraspecific variation in *Sarracenia rubra* Walter: Some observations" (Castanea 42 : 149-170, 1977. See CPN 6 : 59). These include *S. rubra* ssp. *rubra* along with ssp. *jonesii* (the 1972 Wherry nomenclature retained), ssp. *alabamensis* and ssp. *wherryi.* A description of the fifth taxon proposed by the author — ssp. *gulfensis* — is in press. (Reprints: DE Schnell, Rt. 4, Box 275B, Statesville, NC 28677)

Schnell, DE 1978. Systematic flower studies of *Sarracenia* L. Castanea 43 : 211-220.

Morphometric studies of *Sarracenia* petals are reported for the first time, and tabulated along with other multiple flower characters of various species, subspecies, etc. of the genus. It is concluded that flower characters are more taxonomically useful in this genus than previously thought. Also, some of the characters are of value in determining relationships of populations within the genus. Includes table of characters and figure of "average" flower petal shapes determined morphometrically. (Reprints: DE Schnell, Rt. 4, Box 275B, Statesville, NC 28677).



Recently I observed one of my *Drosera burkeana* plants. It was in bloom, and I was looking at the flowers. I glanced down at the stalk and noticed a lot of gnats that seemed to be stuck on it. I looked at the stalk closely and noticed that it had little tentacles with dew on it. All of the *D. burkeana* plants were the same, so I was wondering if this was normal. Is it? P. W., Ranson, WV

Yes. The stems are "glandular pubescent" and are capable of trapping small insects. L. C. S.



Pinguicula gypsicola

Photo by J. Mazrimas



Pinguicula caudata

Photo by J. Mazrimas

ERRATUM

Due to a mix-up at the printer, the plate of *N.* x *superba-mixta* (p. 16) and *N.* x *nagoya* (p. 25) were reversed and printed sideways.

Beginner's Corner

DROSOPHYLLUM

by L. Song

Drosophylum lusitanicum is native to the coastal areas of Portugal and Morocco, growing in soil that drains well. In attempting to grow this plant in cultivation, this should be kept in mind. The mix that we have used to grow this plant consists of 2 parts by volume 20 mesh silica sand, 2 parts peat moss and 1 part decomposed granite gravel. To a gallon of mix, 1 tablespoon each of dolomite powder and bone meal is added and mixed well.

Drosophyllum seems to grow best during the cooler part of the year, slowing down when summer comes. This is probably due to living where most of the rain comes in the winter months. Most of our plants in Southern California seem to die after flowering during the summer months, especially if the weather has been very warm. Other growers who may have cooler weather the year around may have more success in keeping this plant alive for longer periods. This is indeed the case as reported in an article reprinted from the CP Society of Great Britain found elsewhere in this issue.

Another requirement is good strong light. Lower light levels will result in etiolated plants with weak leaves and color. A plant grown in full sun (for at least half a day) will have red-tipped glands and short internodes. The leaves will trap many insects if they are around. Our plants here at California State University, Fullerton, seem to suffer from the lack of insects, so some foliar feeding is done with a weak fertilizer solution.

The seed is hard-coated and resistant to germination; some treatment, such as scarification, is necessary to get good germination. Seeds will germinate usually durng the fall and will retain their ability to germinate for many years. We have gotten germination for about three years from previously planted flats where the seed was not treated. So far, seed is the only reliable way to propagate this plant.

Several pests and diseases can attack *Drosophyllum*. Mealybug, aphis (plant lice) and caterpillars can be a serious problem, but can easily be controlled by hand picking or a mild insecticide. We have used, with no damage, Metasystox-R with toxaphene (the mention of brand/trade names, to the exclusion of others, is for convenience only and in no way constitutes CPN's endorsement), fumigated with Plantfume 103 (see CPN 4(4):58-59) and for caterpillars, Biotrol, which is a preparation of *Bacillus thurgiensis,* a disease specific for them.

During prolonged periods of cool moist weather, *Bortrytis* or grey mold can be a problem. Treatment with Benomyl or other suitable fungicides as well as keeping all dead leaves cleaned off will alleviate the problem. The seedlings are also quite susceptible to damping off disease. Soil mix should be sterilized and over-watering should be avoided. This is why the soil mix we use has such coarse sand.

Seed is best sown where plants are to grow permanently; however, they can be very carefully transplanted while the plants are still seedlings, if care is taken not to break too many roots. Water well



PAT HANSEN, CPN secretary/treasurer, was barely able to recognize Venus' flytrap when she began working with CPN two and one-half years ago. Considerably more knowledgeable now, she can hold her own in conversation with people who know nothing about CP.

A Russian major in college, Pat's experience with plants extends mainly to vegetables and annuals. In addition to her work with CPN, she types Slavic linguistics manuscripts, volunteers considerable time at the Fullerton Arboretum, and mothers two small children.

Aside from becoming acquainted with "these marvelous plants", Pat appreciates most her contact with CPN'ers, who are friendly, interesting and very cooperative. She is hopeful that the CP bog at the Arboretum will provide a focal point for CP meetings in the not-too-distant future.

WANT ADS

Gordon Hanna, 168 Kilaben Road, Kilaben Bay, 2283, AUSTRALIA. (TS) N. maxima, D. auriculata, D. peltata.

Steve Hawkins, Rt. #4, Forest Hills, Marion, N.C. 28752. (WB) N. ampullaria, N. sanguinea, N. villosa, N. gracillis, N. lowii, Sarracenia oreophila, S. purp. x minor (cuttings, seeds). Heliamphora, Drosera regia, D. burmanni, Sarracenia rubra, N. rafflesiana, N. fusco (plants, seeds, cuttings).

and keep in a cool, well-lit place for a few days until they recover.

The large sulphur-yellow flowers are open for a single day only, but are produced over a period of weeks. They are self-fertile and usually set seed without any manipulation, but to insure seed set, rub two flowers gently together, making sure that pollen is deposited on the stigma, which is visible on top of a dome-like structure in the center of the flower. The black seeds can be harvested when the stem below becomes dry or when the dome (ovary) splits open, exposing the black seeds.

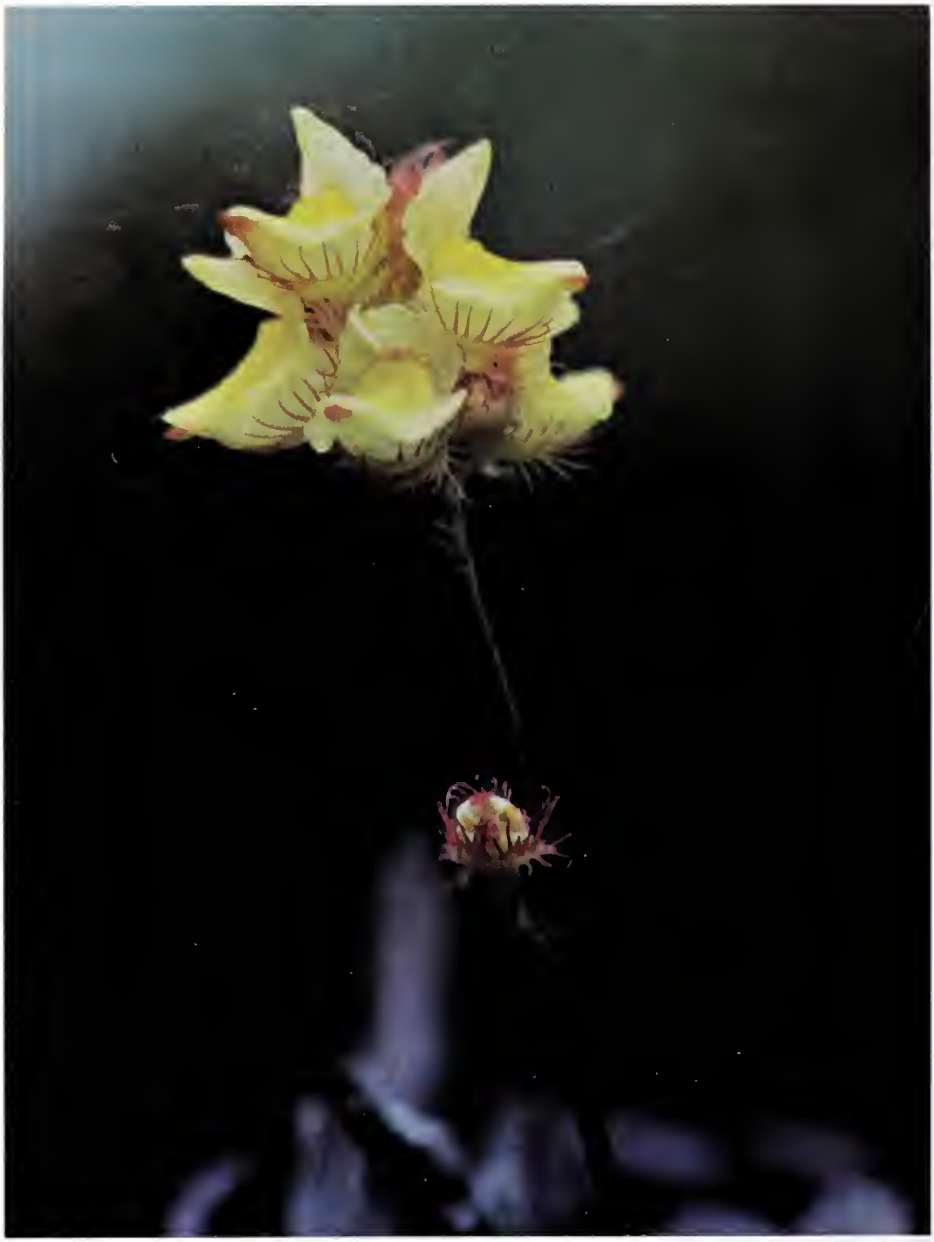
(Continued from page 59)

successfully transplanted to the greenhouse. These test tube plants reach maturity in less time than those grown from seed.

PLANT PRODUCTION

For the commercial grower, large scale production of any plant requires a predictable quality and uniformity of the crop. One thing I try to do is select those plants with the most favorable characteristics and keep them for stock. Another thing is to standardize a soil mix and fertilizer program. Using *Miracid*® and the soil mix described above, healthy carnivorous plants can be produced by growers and hobbyists alike. The result is not only improved quality, but more importantly, increased quantity available so that field collection is no longer necessary. (Fig. 2) (Received 5/12/79)

NOTE: Bill Carroll sent seed to the CPN seed bank so that all requests for seed should be directed to that source. Seed is 50¢ per packet. See page 43.



Close up of the flower spike of *Utricularia simulans*. Photo by D. Schnell

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